



Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street SW
Washington, DC 20554

Re: IB Docket No. 11-109

Dear Ms. Dortch,

I have serious concerns about LightSquared's proposal for a nationwide 4G LTE system. I'm afraid that neither LightSquared nor the FCC fully understands the impact of LightSquared's proposed system on GPS receivers, America's small businesses, and America's economy.

Hundreds of thousands of high-precision GPS receivers in the U.S. are used across many market segments including civil/environmental engineering, construction, land surveying, Geographic Information Systems (GIS), agriculture, forestry, road/rail/airport, hydrography, environmental, water/gas/electric/oil/telecom utilities, mining, bridge/dam monitoring, emergency management, defense & intelligence, higher education, and all levels of Federal, State and Local government.

To illustrate, allow me to describe some examples of how high-precision GPS is being used.

In road construction, high-precision GPS offers a 5-to-1 efficiency advantage over legacy construction equipment. Can you imagine the delays if road construction projects took five times longer to complete? California's Department of Transportation (CALTRANS) currently has 846 construction projects ongoing with construction costs of ~\$10.5 billion. High-precision GPS receivers are a critical component of these projects. Projects such as the widening project pictured below, are completed way ahead of schedule. For this reason, CALTRANS has invested in 250 high-precision GPS receivers valued at ~\$5 million (~\$20,000 per receiver).

It's not just large, high-precision GPS receiver deployments that matter. GPS also keeps the public safe.

In Florida, the 5.5 mile Sunshine Skyway Bridge spanning Tampa Bay has five high-precision GPS receivers permanently mounted on it so engineers can monitor the health of the structure. On an annual basis, more than 18 million vehicles travel over the bridge. High-precision GPS is a core technology that ensures the safety of those 18 million vehicles.



The structural integrity of the Sunshine Skyway Bridge over Tampa Bay is continuously monitored by high-precision GPS receivers, ensuring the safety of more than 18 million vehicles per year

It's not just thousands of public entities that are invested in high-precision GPS technology. Tens of thousands of U.S. small businesses rely on high-precision GPS technology in their daily operations.

A small land surveying firm owner in Virginia says:

"I have relied on GPS for survey grade data for at least 15 years. We use GPS every day for all projects. If GPS becomes unavailable or unreliable it will just about put us out of business. Our \$500,000 investment would become worthless."

Finally, high-precision GPS users rely on a complex infrastructure of 7,000+ high-precision, fixed-mount GPS base stations deployed nationwide. The infrastructure began with a few receivers in the early 1990s and has been built upon over the past 18 years by the GPS user community volunteering time, money, equipment, and expertise. It would be impossible to replace all of these receivers since the ownership is so disparate. Many are publicly owned and the rest are commercially owned by businesses and used by people in all the market segments I listed above. To illustrate, one such network consisting of more than 875 high-precision GPS receivers is located in the western United States managed by UNAVCO, a university-governed consortium which is sponsored by the National Science Foundation (NSF), National Aeronautics and Space Administration (NASA), U.S. Geological Survey (USGS), and National Oceanographic and Atmospheric Administration (NOAA).

UNAVCO uses this massive network of high-precision GPS receivers to, among other things, monitor the earth's crustal plate movement (think earthquake monitoring).

Another type of high-precision GPS network is called an RTK network. It delivers real-time, high-precision corrections to engineers, surveyors, Geographic Information Systems (GIS) specialists, construction specialists, and others. This particular network, owned by Keystone Precision Instruments, consists of 178 fixed-mount, high-precision GPS receivers and delivers high-precision GPS corrections to users in New York, Pennsylvania, Maryland, Virginia, Delaware, New Jersey, Connecticut, Vermont, Massachusetts, Rhode Island, New Hampshire, and Maine.

Like the UNAVCO network, the Keystone Precision Instrument RTK Network is a multi-million dollar investment in high-precision GPS infrastructure.

Contrary to what LightSquared asserts, the GPS user community did not know anything about this potential interference until November 2010. LightSquared and the FCC incorrectly assumed



that communicating/negotiating with the U.S. GPS Industry Council (USGIC) was the equivalent of communicating/negotiating with the GPS user community. That is a false assumption. The USGIC does not communicate directly with the GPS user community and never has. That's not its role. I've been personally involved in the high-precision GPS industry for 20+ years and writing a monthly newsletter on high-precision GPS technology for GPS World magazine for the past five years. I attend almost every major GPS conference and high-precision GPS market segment conference in the U.S. and some abroad. The first I'd heard about the LightSquared interference issue was November 2010.

Furthermore, there is a clear precedent already set that demonstrates how to handle a case very similar to the current LightSquared situation. In 2008, the U.S. Air Force proposed to discontinue supporting the semicodeless technique that is used by virtually every civilian L1/L2 high-precision GPS receiver in existence. It was the first time in history that an action would render several hundred thousand high-precision GPS receivers obsolete, a scale which is very similar to the impact of the LightSquared system.

The U.S. Air Force, to its credit, did a fantastic job of communicating directly with the GPS user community along with the Department of Commerce. It issued public statements describing the impact the action would have on high-precision GPS receivers.

The Air Force had set a period of one year to transition away from using the semicodeless technique. That action would have destroyed the high-precision GPS user community resulting in billions of dollars in losses and widespread small business closure. Fortunately, they did their homework, understood the impact, and made the correct decision.

LightSquared, on the other hand, either didn't do its homework or intentionally kept quiet in order to fly under the radar and push its initiative through before the GPS user community (and others) knew what was happening. In either case, the GPS user community shouldn't be held accountable in paying for the FCC's and LightSquared's lack of communication/notification.

The idea of LightSquared using its licensed upper frequency spectrum (1545-1555 MHz) for terrestrial purpose needs to be permanently abandoned. It's clear from the test results that this causes widespread GPS interference no matter which class of GPS is used.

Finally, I would like to emphasize that the GPS user community should bear no cost as a result of any interference from LightSquared's system. The GPS user community was blindsided in November 2010. While you can debate whether about the communication between the FCC, MSV/Skyterra/LightSquared, and the U.S. GPS Industry Council, no case can be made that the GPS user community knew of MSV/Skyterra/LightSquared's intentions earlier than late last year.



Even if LightSquared only uses the licensed lower spectrum (1526-1536 MHz), as it has proposed as an alternative, the number of high-precision receivers affected would be at least 200,000 at an estimated replacement cost of \$10,000 per unit which equates to a total equipment replacement cost of \$2 billion dollars. That does not include the cost of removal/installation, lost productivity, required software upgrades, and training. Does the FCC expect the GPS user community to bear that cost?

For the above reasons, I recommend that the FCC deny LightSquared's request to proceed and encourage them to use spectrum outside of the MSS band. The resources expended by federal/state/local governments and private corporations to vet LightSquared's proposal to use the MSS band has run into the tens of millions of dollars, if not more than a one hundred million dollars. I'm afraid the cost of further vetting will double or triple the expenditure as well as result in tremendous opportunity cost as significant resources are expended by public and commercial entities to continue this debate.

Thank you for your attention.

Sincerely,

K. Scott Thompson, PLS